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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/781,655	02/12/2001	Wlodek Mandecki	7295/43	9494

7590 04/10/2002

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EXAMINER
FREDMAN, JEFFREY NORMAN

ART UNIT	PAPER NUMBER
1637	16

DATE MAILED: 04/10/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/781,655	Applicant(s) Mandecki
	Examiner Jeffrey Fredman	Art Unit 1637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *three* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Mar 7, 2002* .

2a) ☒ This action is **FINAL.** 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *31-46* is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *31-46* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
18) ☐ Interview Summary (PTO-413) Paper No(s). _____
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other:

DETAILED ACTION

Sequence Rules

1. The current case now complies with the sequence rules.

Claim Rejections - 35 USC § 112

2. The rejection of claims 16-24 under 35 U.S.C. 112, second paragraph, is moot in view of the cancellation of those claims.

Double Patenting

3. Claims 31-46 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-19 of U.S. Patent No. 6,051,377 in view of either Zavracky et al (U.S. Patent 4,989,934) or Nova et al (U.S. Patent 5,751,629) and further in view of Tuttle (U.S. Patent 5,300,875).

Claims 1-19 of U.S. Patent No. 6,051,377 teach a method of detecting a target nucleic acid sequence in a sample, comprising the steps of: (a) providing a solid phase comprising particles having transponders, the transponders having memory elements, the particles having a nucleic acid probe attached to a surface of the solid phase particles, the probe having a sequence complementary to a target sequence, the transponders having an index number encoded in the memory element; (b) contacting the solid phase with a sample to form a sample mixture; (c) increasing the amount of the target nucleic acid subjected to analysis by PCR amplification, using at least one oligonucleotide primer which is not immobilized on the solid phase, said PCR amplification comprising at least one cycle of: (1) denaturation of nucleic acids in the sample

mixture; (2) hybridization of nucleic acids in the sample mixture; (3) chain extension with DNA polymerase; (d) analyzing the solid phase to detect the presence of a label indicative of binding of the target nucleic acid; and (e) decoding the data encoded on transponders using the dedicated read/write scanner to identify the class of transponders to which analytes are bound.

Claims 1-19 of U.S. Patent No. 6,051,377 does not teach that the transponder is a monolithic integrated circuit nor do Claims 1-19 teach the use of a photovoltaic cell outside the transponder to serve as the energy source.

Zavracky teaches an monolithic integrated transponder device (abstract).

Nova teaches a monolithic integrated transponder device (which is simply a device on a single substrate) (column 7, lines 6-20).

Tuttle teaches integrating a photovoltaic cell as a power source for a transponder tag (abstract).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine the use of monolithic integrated circuits with the detection method of claims 1-19 of U.S. Patent No. 6,051,377 since Nova states "The preferred miniture recording device for usin in the combinations herein is a single substrate (column 7, lines 7-8)"., thus expressly motivating selection of single substrate devices. Motivation is also provided by Zavracky, who states "As these systems become sufficiently complex, the use of optoelectronic integrated circuites (OEIC) is becoming increasingly attractive for cost and performance reasons (column 1, lines 20-23)". An ordinary practitioner would have been motivated to use monolithic

integrated circuits in the method of claims 1-19 of U.S. Patent No. 6,051,377 for the express motivation of Nova that this is a preferred embodiment and for the express motivations of Zavracky who notes that these integrated circuits are preferred for cost and performance reasons.

Further, it would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine the use a photovoltaic cell on the integrated circuit transponder as taught by Tuttle, who states "The present invention allows for passive (non contact) means to recharge a battery residing in a transponder unit that may or may not be directly accessible for handling (column 1, lines 60-63)". An ordinary practitioner, faced with the use of battery powered transponders in the method of claims 1-19 of U.S. Patent No. 6,051,377 in view of either Zavracky et al (U.S. Patent 4,989,934) or Nova et al (U.S. Patent 5,751,629) would be motivated to use the photovoltaic recharging method of Tuttle in order to passively recharge the battery without requiring handling in order to simplify the assay.

4. Claims 31-46 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-12 of U.S. Patent No. 6,001,571 in view of either Zavracky et al (U.S. Patent 4,989,934) or Nova et al (U.S. Patent 5,751,629) and further in view of Tuttle (U.S. Patent 5,300,875).

Claims 1-12 of U.S. Patent No. 6,001,571 teach a method of detecting a target nucleic acid sequence in a sample, comprising the steps of: (a) providing a solid phase comprising particles having transponders, the transponders having memory elements, the particles having a nucleic acid probe attached to a surface of the solid phase particles, the probe having a sequence

complementary to a target sequence, the transponders having an index number encoded in the memory element; (b) contacting the solid phase with a sample to form a sample mixture; (c) denaturation of nucleic acids in the sample mixture; (d) hybridization of nucleic acids in the sample mixture, (e) analyzing the solid phase to detect the presence of a label indicative of binding of the target nucleic acid; and (f) decoding the data encoded on transponders using the dedicated read/write scanner to identify the class of transponders to which analytes are bound.

Claims 1-12 of U.S. Patent No. 6,001,571 does not teach that the transponder is a monolithic integrated circuit.

Zavracky teaches an monolithic integrated transponder device (abstract).

Nova teaches a monolithic integrated transponder device (which is simply a device on a single substrate) (column 7, lines 6-20).

Tuttle teaches integrating a photovoltaic cell as a power source for a transponder tag (abstract).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine the use of monolithic integrated circuits with the detection method of claims 1-12 of U.S. Patent No. 6,001,571 since Nova states "The preferred miniture recording device for usin in the combinations herein is a single substrate (column 7, lines 7-8)"., thus expressly motivating selection of single substrate devices. Motivation is also provided by Zavracky, who states "As these systems become sufficiently complex, the use of optoelectronic integrated circuites (OEIC) is becoming increasingly attractive for cost and performance reasons

(column 1, lines 20-23)". An ordinary practitioner would have been motivated to use monolithic integrated circuits in the method of claims 1-12 of U.S. Patent No. 6,001,571 for the express motivation of Nova that this is a preferred embodiment and for the express motivations of Zavracky who notes that these integrated circuits are preferred for cost and performance reasons.

Further, it would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine the use a photovoltaic cell on the integrated circuit transponder as taught by Tuttle, who states "The present invention allows for passive (non contact) means to recharge a battery residing in a transponder unit that may or may not be directly accessible for handling (column 1, lines 60-63)". An ordinary practitioner, faced with the use of battery powered transponders in the method of claims 1-12 of U.S. Patent No. 6,001,571 in view of either Zavracky et al (U.S. Patent 4,989,934) or Nova et al (U.S. Patent 5,751,629) would be motivated to use the photovoltaic recharging method of Tuttle in order to passively recharge the battery without requiring handling in order to simplify the assay.

5. Claims 31-46 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-11 of U.S. Patent No. 5,736,332 in view of either Zavracky et al (U.S. Patent 4,989,934) or Nova et al (U.S. Patent 5,751,629) and further in view of Tuttle (U.S. Patent 5,300,875).

Claims 1-11 of U.S. Patent No. 5,736,332 teach a method of determining the sequence of a target nucleic acid sequence in a sample, comprising the steps of: (a) providing a solid phase comprising particles having transponders, the particles having an oligonucleotide probe attached

to a surface of the solid phase particles, the transponders having memory elements and an index number indicating sequence of the probe encoded on the transponders; (c) contacting the solid phase with a sample to form a sample mixture; (d) denaturing nucleic acids in the sample mixture; (e) hybridizing the nucleic acids in the sample mixture, whereby target nucleic acid sequences hybridize to complementary probes; (f) analyzing the solid phase to detect the presence of a label indicative of binding target nucleic acid to probes; (g) decoding the data encoded on transponders using the dedicated read/write scanner to identify the sequence of the probes to which target nucleic acids are bound.

Claims 1-11 of U.S. Patent No. 5,736,332 does not teach that the transponder is a monolithic integrated circuit.

Zavracky teaches an monolithic integrated transponder device (abstract).

Nova teaches a monolithic integrated transponder device (which is simply a device on a single substrate) (column 7, lines 6-20).

Tuttle teaches integrating a photovoltaic cell as a power source for a transponder tag (abstract).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine the use of monolithic integrated circuits with the detection method of claims 1-11 of U.S. Patent No. 5,736,332 since Nova states "The preferred miniture recording device for usin in the combinations herein is a single substrate (column 7, lines 7-8)"., thus expressly motivating selection of single substrate devices. Motivation is also provided by

Zavracky, who states "As these systems become sufficiently complex, the use of optoelectronic integrated circuites (OEIC) is becoming increasingly attractive for cost and performance reasons (column 1, lines 20-23)". An ordinary practitioner would have been motivated to use monolithic integrated circuits in the method of claims 1-11 of U.S. Patent No. 5,736,332 for the express motivation of Nova that this is a preferred embodiment and for the express motivations of Zavracky who notes that these integrated circuits are preferred for cost and performance reasons.

Further, it would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine the use a photovoltaic cell on the integrated circuit transponder as taught by Tuttle, who states "The present invention allows for passive (non contact) means to recharge a battery residing in a transponder unit that may or may not be directly accessible for handling (column 1, lines 60-63)". An ordinary practitioner, faced with the use of battery powered transponders in the method of claims 1-11 of U.S. Patent No. 5,736,332 in view of either Zavracky et al (U.S. Patent 4,989,934) or Nova et al (U.S. Patent 5,751,629) would be motivated to use the photovoltaic recharging method of Tuttle in order to passively recharge the battery without requiring handling in order to simplify the assay.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 31-33, 35, 37-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai et al (JP 04148700 A2) in view of Nova et al (U.S. Patent 5,751,629) and further in view of Tuttle (U.S. Patent 5,300,875).

Nagai teaches a method of detecting a target nucleic acid comprising the steps: a) providing a solid phase particle, b) contacting said solid phase particle with said sample, d) denaturing nucleic acids in the sample mixture, e) hybriding the nucleic acid in the mixture such that the target will hybridize with the oligonucleotide bound to the solid phase particle, f) detecting the hybridized complex (abstract and entire patent, especially page 748, column 2 and page 749, column 1). Nagai further teaches the use of a fluorescent labels covalently linked to the nucleic acids and a flow cytometer (abstract, page 748, column 1, and figures 1 and 2).

Nagai does not teach the use of a monolithic integrated transponder photocell device as the solid phase particle for detection using a hardware connected antenna in the flow cytometer and the examiner is unsure of whether Nagai teaches adjustment of the size of the flow cytometer for the particles.

Nova teaches multiplex detection of biopolymer interactions using solid phase particles which are monolithic integrated transponder devices (column 23-26). Nova expressly teaches detection of nucleic acids by immobilization onto the solid particles (columns 13 and 37). Nova teaches a scanner device which comprises (a) a chamber for solid phase particles with transponders which chamber is adjusted to allow for the flow of the solid phase particles (column

28, lines 42-67), (b) a fluorometer (column 28, line 63 to column 29, line 49), (c) an antenna for receiver a radio frequency signal (column 28, lines 56-62). Nova further teaches a flow system for solid phase particles (column 28, lines 42-55). Nova further teaches a laser in the device (column 28, line 65). Nova further teaches hardware to decode the signal (columns 29 and 30), as well as magneto-optical materials and optical discs (column 30). Nova further teaches the use of photocells in the integrated device (columns 26 and 27).

Tuttle teaches integrating a photovoltaic cell as a power source for a transponder tag (abstract).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine the method of Nagai with the use of transponders as taught by Nova since Nova states "These combinations are particularly advantageous for use in multianalyte analyses (column 1, lines 37-40)". An ordinary practitioner would have been motivated to combine the flow cytometric method of Nagai with the combined flow cytometric and transponder method of Nova for the express benefit of ease of multianalyte analyses, the simpler recording and identification of data points and the greater control provided by the additional tracking using the radiofrequency tags (see column 1, lines 60-63).

Further, it would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine the use a photovoltaic cell on the integrated circuit transponder as taught by Tuttle, who states "The present invention allows for passive (non contact) means to recharge a battery residing in a transponder unit that may or may not be directly

accessible for handling (column 1, lines 60-63)". An ordinary practitioner, faced with the use of battery powered transponders in the method of claims 1-11 of U.S. Patent No. 5,736,332 in view of either Zavracky et al (U.S. Patent 4,989,934) or Nova et al (U.S. Patent 5,751,629) would be motivated to use the photovoltaic recharging method of Tuttle in order to passively recharge the battery without requiring handling in order to simplify the assay.

8. Claims 31-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai et al (JP 04148700 A2) in view of Nova et al (U.S. Patent 5,751,629) and further in view of Tuttle (U.S. Patent 5,300,875) and further in view of Kobayashi et al (Mol. Cell. Probes (June 1995) 9:175-182).

Nagai in view of Nova teach the limitations of claims 31-33, 35, 37-46 as discussed above. Nagai in view of Nova do not teach single nucleotide extension using fluorescent dideoxynucleotide terminators.

Kobayashi teaches single nucleotide extension using fluorescent dideoxynucleotide terminators (abstract).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine the method of Nagai in view of Nova with the method of Kobayashi since Kobayashi states "In conclusion, mutation detection employing an automated, fluorescence based multiplex minisequencing approach offers many advantages over current approaches. (Page 180, column 2)". An ordinary practitioner would be motivated to utilize the flow cytometric method of Nagai in view of Nova with the fluorescent minisequencing approach

of Kobayashi for the expected benefits of a more cost effective, rapid and high volume assay for DNA based screening for known mutations in a clinical laboratory setting.

Response to Arguments

9. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Fredman, Ph.D. whose telephone number is (703) 308-6568.

The examiner is normally in the office between the hours of 6:30 a.m. and 4:00 p.m., and telephone calls either in the morning are most likely to find the examiner in the office.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion, can be reached on (703) 308-1119.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0196.

Papers related to this application may be submitted to Technology Center 1600 by facsimile transmission via the P.T.O. Fax Center located in Crystal Mall 1. The CM1 Fax Center numbers for Technology Center 1600 are either (703) 305-3014 or (703) 308-4242. Please note that the faxing of such papers must conform with the Notice to Comply published in the Official Gazette, 1096 OG 30 (November 15, 1989).

Jeffrey Fredman
Primary Patent Examiner
Art Unit 1637

April 5, 2002